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VOL. XXIX, No. 21. OCTOBER 13, 1932

THE JOURNAL OF PHILOSOPHY

REASON AS FACT AND AS FETICH. (I)

NOBODY but a formal logician believes that the effective meaning of a word can be discerned in other words which a dictionary might employ to define it. Current usage presents only today's phase of a social event, an event whose remote beginnings reach back to a dim past and whose terminations are uncertain. What a word denotes no more sets forth its meaning than a man's vocation reveals his personality. All the significances which are the words' past, all the influences from their origins, their conditions, their development, flow together and interweave at its denotation. They suffuse it with meanings which work upon the mind without appearing to the consciousness, imparting to it their peculiar emotional tone, their bouquet and flavor, and thereby make it glamorous or hateful or indifferent. In this feeling-tone which every word possesses, the flow and variety of meanings it used to carry are condensed into a single and not always harmonious sentiment. Their inter-relations and places within the sentiment compose the fullness of a word's possible import when the user takes it up to express his own particular thought. That thought determines the word's final significance. Itself an event in an individual history, it consists of the thinker's specific response to his symbol and to the situation which stimulates him to employ it; and it culminates in a pattern of posture and vocalization wherein the thinker's spoken or unspoken pitch, accent, tempo, tonality, often are more important as instruments of communication than the verbal form itself. For it is they, and not the form, that delimit the place of the word in his stream of thought.

Hence it comes that no two minds can mean quite the same thing by the same term. Their meanings involve irreducible surds. They can touch. They can bump together. They can overlap. But they can not coincide. The common edges of their intent extend into aggregates of unique intentions whose variety is never reduced to a common denominator. These intentions may interfuse, but as in a melody, where the separateness and sequence of tones constitutes the interfusion and unity of the melodic phrase. In the total meaning of a term, the successive significations both retain their identity and lose it.

These traits stand out in the persistent symbols of psychology and philosophy—in such expressions as *matter, mind, life, experience, will, the unconscious, reason,* etc. One need not stress how each of these terms figures in different systems with diverse and ultimately incommensurable meanings, according to the state of culture and the ruling passions of the places and the times of its use. Or how the tradition (which mixes each particular diversity into the others as the present moment of a man's life is mixed into all of his past experiences) absorbs from each of them an increment that carries over to the next generation. Thus, men of any time later than the bronze age of our western culture can, in using these words, mean by them neither unequivocally identical things nor irreducibly different ones. The full present meaning is a complex of meanings from which the generations make selections according to the time and place and circumstances of their utterance.

2. With this in mind, let us consider the meanings of the words "logic," "intellect," "intelligence," "reason," "rationality," and their derivatives. The words of this group belong together in the sense that they apply to a common field of human experience. They point to the same objects and activities, they name the same instrumentalities and techniques, and their meanings tend to hold the same status in the aggregate of human functions. On the whole, they came late in the life of language. This means that the activities which they name entered the field of conscious attention and became material for conscious control perhaps a very long time after they had taken shape as significant vital functions. It is a matter of curious interest that up to the fifth century before the Christian era neither the near nor the far Eastern peoples had made up discriminative names for them; and that these appear in the speech of only one western people—the Greeks. And among the Greeks, the primary meanings of the word for Reason is not a spiritual faculty, invisible and immaterial, but merely audible, tangible, verbal sound, speech. "By thinking," Plato makes Socrates say in the *Theaetetus,* "I mean the conversation which the soul holds with herself when considering anything. I speak of what I hardly know; but the soul when thinking appears to be just talking—asking questions of herself and answering them, affirming and denying them." In other words, Reason is *Logos,* the word.

The realization of speech, of the Word and its power, must have been as momentous a prehistoric experience as the discovery of paternity. How much primitive behavior centers around the avoidance, the secreting or the sacred uses of certain words, is anthropological commonplace. Saying can be even more potent than doing, as anybody knows who has been brought up in the Christian

tradition and is acquainted with the Holy Bible. Indeed, to the primitive mind anywhere, the word itself as such is a force beneficent or malevolent, capable of accomplishing anything—natural or supernatural; it believes that the master of the right word is the master over the causes of events and the ruler over good and evil. This belief contains nothing fanciful or extraneous to experience. It is a summary of empirical observation. Heard sounds are followed by events; shall they not be the causes of events? They are, in the conduct of men and women; why not in the behavior of the sun, the moon, the planets, and the changes and cycles of the earth? Rituals develop of invocation and exorcism, blessing and cursing. They are operated as mechanisms of control, calling for extreme precision and refinement of use, the slightest error vitiating the effect. In the course of time sophistication steps in. The efficiency is transferred from the word itself, which anybody may use, to a particular speaker specially trained, and from the visible speaker to an invisible faculty, that becomes a mental power. Logos, which began as speech, has been transformed into *the logos* which is the Pure Reason, using speech.

3. This level had been the convention of the Greece to which the enlightenment came. What is this enlightenment, if not an eager concern about the meanings and effects of words? What else is it that the Sophists and Socrates and Plato and Euripides *add* to the folkways, to the beliefs and practices of fifth-century Athens? Shaken out of the comfortable customs of the ancestors by foreign invasion during a great war, brought thereby into responsive contact with a wide and variegated world, the Athenians of the days of Pericles found themselves endeavoring after a new social pattern which they called democracy. And what else could the tool of such a democracy be but the spoken word? To speak well was indispensable to success in public life, and a life not public could not be good. All ambitious young men of family were eager to learn the art of using words—oratory, the art of persuasion.

And the result: the greater proportion of what went for science and philosophy in those days was preoccupied with words and their relations. Those became the standard material of learning and have remained so till this day. The Athenian *sophist* was followed by the Roman *rhetor,* the Roman *rhetor* by the medieval master of arts and *doctor,* but the essential discipline was ever a discipline of words—whether as grammar or as rhetoric or as metaphysics or as logic. λογικη is of speech first, and then of "reason," and also remains ambiguously of both to the present day.

For it is easy enough to exhibit the color when we say *red,* and the thing when we say *chair* or *table;* but all that is substantially

present when we speak of the *ens rationis* or *universal* is the verbal pattern itself and a sentiment or attitude responsive to its place in a verbal and social context. The distinction which obtains today between these verbal disciplines was not there in the beginning; it is an eventual distinction generated because men responded to words, which are actually symbols of feelings and things, as autonomous powers, and as if the grammatical relationships preceded the manifold experiences of the daily life instead of being occasioned by them.

So the ancestral ghost about whose placation and control Greek religion largely centered, becomes displaced by the governing reason of Plato's Otherworld of ideas (their alter egos are words) and this by the νους ποιητικος, the creative intelligence of Aristotle's psychology and metaphysics. That Otherworld of Plato's is Olympus and the Elysian Fields deprived of their local geography and dramatic story, stripped down to the bare verbal system and the feelings it arouses. The kosmos of Aristotelian metaphysics still further disincarnates that Otherworld. The grammarian's differentiations between parts of speech are projected upon the field of non-verbal experience as its definitive structure. They are established as the metaphysics of matter, form, substance, accident, and their relations; while the ancestral ghost of Greek religion gets changed over into the immortal Reason which has no organ in the human body. Aristotle can find no bodily part for this νους ποιητικος to work from because the forms or universals it is presumed to occupy itself with seem to go with words, but with nothing else that the senses can grasp. For this reason the phonations are declared to stand for beings invariable, immaterial, impersonal, invisible, intangible, out of place and out of time. Why, under such conditions, there can be a word for them at all is a mystery which solves itself as soon as one realizes that the word and its correlative attitude are all there is, that there isn't any more.

So the transvaluation of the word culminates. Beginning in God-knows-what dark and accidental lallation of an animal organism struggling to live at the risk of its life, the word operates on that organism and on its relations to its fellows and to the surrounding world in such a manner as to heighten and intensify its changing away from the animal into the human. The function of the word as communication gets shaped over into an immortal power alone capable of dealing with an unseen world of universals, an eternal creative Logos. And this eternal creative Logos is but the projection of the empirical experience of the action of words upon the residual universe. It is the last place of felt effect, glorified into a first cause. Made flesh again and dwelling on earth, this Logos saves man from sin and separateness, as the neo-Platonic systems tell and

the Christian ones repeat, completing the circle. For all the ages of antiquity Reason stays the chief glory of man, the one differentia wherein is established his not being as one of the beasts. The whole movement involves the hypostasis of an instrument, the idolization of a tool, through dealing with a workaday function honorifically, so establishing it as a metaphysical faculty with magical powers.

4. Because the apprehension of "universals" is a mystery. It is an activity described by analogy with hearing and seeing, but a hearing and seeing of that which can be audible to no ear and visible to no eye; and which is therefore called intelligible! Kant's "intelligible world" is a world beyond all sense, a world sweeter still of entities unseen and unheard. Yet communication concerning it is impossible without spoken or written signs which must be heard and seen if such entities as "the categories of the understanding" are to be apprehended even in soliloquy. This is the world of the "pure reason," the world of "logic." It is this world which remains a chief preoccupation of the philosophic tradition. Its fundamental rule was formulated by Aristotle in the so-called "Laws of Thought"; the law of identity: *whatever is, is;* the law of contradiction: *nothing can both be and not be;* the law of excluded middle: *everything must either be or not be.* From Aristotle's day to this, the art of thinking, the exercise of reason, has been prevailingly regarded as conformity to these laws of thought. All the canons and devices of formal logic have been developed as techniques to ensure this conformity and to detect violations. Experiences of belief, invention, discovery, or imagination, leading to new knowledge and insight into the external world, have been either disregarded or denied validity or belittled as "mere psychology"; where these deprecating efforts failed to prevail, the experiences have been translated into "correct" logical form.

During the Middle Ages, the "ages of faith," the prestige of logical form was particularly great, and formal logic underwent signal development. This arose from the exigencies of the Faith itself. For the dogmas of salvation did not have their origin in the experience of the daily life, and such an origin would have been denied them as blasphemous if it had been attributed to them. The dogmas of salvation came as a revelation from "the intelligible world" and as a revelation directly antagonistic to the courses of nature and the experiences of the daily life; so much so, that the antagonism was offered as the ground for faith in the dogmas: *credo, quia asurdum.* But since these dogmas were descended to a scene with which they were by definition not at peace, they had to struggle to prevail. In this struggle they were aided by two champions. The first was material force, which shattered or extirpated

opposition from proponents of alternative revelations. The second was logical prowess which disciplined what was known of the philosophic tradition to the uses of religion. Philosophy was retained as the handmaid to theology. Plato was apprenticed to the prophets and Aristotle made serf to revelation. To do this called for an elaboration of verbal subtleties, a concern with the forms and devices of disputation which contributed much to advance the art of "strict and rigorous thinking," or logic.

The dynamic of this process did not, of course, lie in the momentousness of the debated issues. It lay in the war for power and privilege between church and empire and between different orders and societies—like the Dominicans and Franciscans—within the church. Realists, nominalists, and conceptualists were driven by quite another concern than the existence of "universals" and the relative position of these sectarians at any given time was a fair barometer of the preponderance of power and influence of church or state, or lack of them in both.

Medieval philosophy presents, in fact, a comprehensive rationalization of the pretensions of various major institutions of medieval life. The need to rationalize was the mother of the characteristic logical elaboration, the creation and extension of far-flung "universes of discourse." In actual use, Reason was synonymous with the skill in employing verbal patterns to maintain a doctrine and to overthrow its competitors. Theologically and metaphysically Reason was a faculty conversant with universals in their eternal and necessary relations. It worked by means of the syllogism, an instrument than which none could be more strict, rigorous, precise. . . .

5. The Renaissance revulsion against the whole medieval view of life struck especially hard at the scholastic techniques. They became objects of derision even more than of refutation. All their ways and works became examples of irrationality and futility. Reason took on a new meaning. Not all at once. Not consistently with reference to any single field. But here a little and there a little, until an intention took form, acquired momentum and drive. To the degree that the men of the Renaissance carried over the interests of the Middle Ages, they tended also to repeat the techniques. The Florentine neo-Platonists may express a different spirit, but they do not use a different dialectic from Peter the Lombard or Thomas Aquinas or Duns Scotus.

The new spirit in the field of thought is an effulgence from new interests involving new activities conditioned on new objects. Gone is the day of *entia rationis,* the "intelligible world" of universals, projected from the ecclesiastical and political establishments. The city-dweller, the craftsman and trader, has emerged from his long

obscuration. His materials, his tools, are solid and tangible stuffs, obviously occupying space, and moving or being moved through it. His craft, his manipulative habits and skill, is a series of measured applications of tools to materials, taking time and distributed in space. His labor consists of events in characteristic sequences that are tangibly comparable with one another. What he does has the same concreteness and force as what Columbus does taking his voyage, or as what Galileo does watching the lamp of the Duomo swing and counting his pulse the while. They are commensurate but neither the one nor the others' actions are commensurate with what St. Thomas and Duns Scotus do, disputing over universals. Here is a new field of action then, the field of everyday actualities. It is apprehended directly. It is empirically and directly subject to analysis. It is indefinitely extensible. The relations between its parts are not imputed; they are felt, directly experienced relations, the relations of space, of material force, and in a cruder, rougher way, of time. How can the term "Reason" fail to be suffused with these qualities, and at last defined by their dynamic?

Of course, it can not. By the end of the seventeenth century rigorous thinking has ceased to be syllogistic and has become mathematical. The Reason or intellect becomes identified with the entertainment of "clear and distinct ideas," and the notion of "clear and distinct ideas" derives from the experienced process of the *zerlegung* of space in terms of felt relations between the parts of it. Who are the makers of the new Reason, the new logical technique? They are students of the properties of space. They are Descartes and his followers, like Spinoza. The latter, in fact, envisages the entire structure of his infinite universe in spatial terms and demonstrates Nature and Man *more geometrico.*

This is not all, however. The daily life of the craftsman and the trader is involved in sequences of reciprocal pushes and pulls. Buying and selling, making and shaping, call for weighing, measuring, timing. Hourglasses and measures had existed also in the Middle Ages, but had received no attention from the higher-ups. The Renaissance came in with the clock. The mechanisms of weighing, measuring, and timing became significant foci of attention, for the skilled city craftsmen depended on them more and more to establish equivalences in production and in exchange. They held these equivalences to a moral signification in the expression "just price." "Just price" names a measure not greater and not less than the worth of the object paid for. It is analogous to the mechanical symmetry of the true balance of a pair of scales. It is more easily stated in terms of equal, undifferentiated counters; that is, in mathematical, than in other terms. Structurally it is an equation. Dy-

namically it is the equality and opposition of action and reaction, of cause and effect, so that there can be no more and no less in the one than in the other. Esthetically, it is the firmness, the reliability of symmetry. Quantity emerges in terms of symmetry and balance. Symmetry and balance present a dynamic stability in terms of quantity. The circle is closed. Certainty gets a new ground and character. As Kepler says: "Nothing can be completely known except quantities or by quantities." This way of knowing becomes identified with Reason.

6. During the eighteenth century the feeling for this meaning of Reason was so strong that it permeated all the activities of the intellectual classes. The universe was described as a perfectly balanced system of forces in which there was a place for everything and everything was in its place. Parts were conceived as being adjusted to one another like cogs in a machine, influencing each other reciprocally as opposite and equal actions and reactions. Newton spoke of the cosmic processes in terms of clocks; Leibnitz expressed the same notion in the formula of "pre-established harmony." The mechanics of reciprocity and symmetry permeated literature and all the arts. Works as contrasted as Pope's *Essay on Man* and La Mettrie's *L'Homme Machine* were alike repetitions of the idea. And the idea was identified with Reason. This Reason was used as the touchstone of everything else, every event and imagining. The period was called the Age of Reason; it is, however, a Reason not in the pattern of Aristotle but the pattern of Newton, a mechanical equilibrium, part balancing part.

This view, as it happened, suited the gentlemen of England. It made the moral inequities of the social structure of which they were the privileged beneficiaries coincident with the mechanical equilibrium in which they were the supremely weighted apices. It never occurred to the wits and whigs whose discourse provided the light of this age of the enlightenment that such a balance was circular and that top and bottom might change places. Mandeville never dreamed of such a possible revolution in his beehive, with a change of rôles between drones and workers. Since, in mechanics, whatever is, must be; it follows in morals, as Pope sang, that whatever is, is right. Mechanism is morality, morality mechanism. Reason is the recognition of the ineluctable nature of things; the application to all experience of the mechanical equation which defines the structure of life, as a sequence of cause, effect, cause, effect, cause. . . .

7. Reaction against this attitude and method set in almost coincidentally with its coming of age. And the system itself was used to prove by strict and rigorous logic, the opposite moral. If Nature is a Newtonian mechanism of eternal wheels of cause and effect going

round and round, no cog in any wheel is better or worse than any other, no unit in any equilibration is of greater weight than any other. Why then the distinctions of station and privilege, of opportunity and power which deform society? They are false to Nature, contrary to Reason. Away with them. Let Nature have full sway. Take the monkeywrench out of the works. Liberate the natural man. Energize his natural rights. Let opportunities be equal. Let each be free to help himself toward the realization of his own happiness, to enter without let or hindrance into the dynamic equilibrium of a natural society in a natural world under natural law. So the American Declaration of Independence might be paraphrased; so the French Bill of Rights. Both are rationalizations of programs of rebellion, not descriptions of things as they are. Both are formulated at the dictates of Pure Reason precisely because at the same dictates and on the same evidence a rule of acquiescence and submission had been imposed before. But now Pure Reason was a technique of revolution, and, indeed, during a phase of the Revolution in France was symbolized in a living woman and worshipped.

It has been said that the avowed faith in Reason declined because of the spread of literacy, because popular education antagonizes the "prolonged discipline" necessary for the proper exercise of reason. I do not think that the record sustains this opinion. It might as well be said that popular education antagonizes the prolonged discipline necessary for the proper exercise of virtuosity on the piano, or acrobatics or prizefighting. Men who were supreme masters of this art of reasoning themselves challenged the competency of Pure Reason to pretend to the supreme rule of life. One need only recall the works of David Hume and Immanuel Kant. It is not for nothing that the *Critique of Pure Reason* is a response to the *Treatise of Human Nature,* and that this response is reverenced by the philosophic generality as a momentous event in the history of western culture. In fact the work did not, as was said of it, remove Reason to make room for Faith; it revalued Reason. It demoted Reason from the status of insight into the eternal and universal nature of things which it had enjoyed from its invention by Plato and improvement by Aristotle till Kant's own day. In compensation it set Reason up as an inward function of the human psyche, merely reflexive, but autonomous and self-sufficient. To know what reality is when it is not known was denied to Reason; but in place of this power it was endowed with the gift of infallible prediction, of making "synthetic judgments *a priori*" since all its reference was internal to itself and all argument had necessarily therefore to be what the syllogism in fact is, argument in a circle. For how can

more come out of a logical deduction than goes into it? Individuality, novelty, discovery, are by definition beyond Reason; all it can do is to argue a foregone conclusion. The premise it argues from, even its own nature, it must take on faith, take from the spontaneities of feeling and doing which do cross the bewitched abyss between subject and object to realities beyond.

8. What is known as the Romantic Movement consists in an elaborate verbalization of the sentiment defined by this point of view. The premise of the Romantics imposes upon them, whatever be their mood and characteristic, the task of somehow bringing together that God and Caesar whom the Kantian critiques have separated—either Caesar-God or God-Caesar. They do this by assimilating the external world to some phase of the psyche of man. One may prefer, like Fichte or Schopenhauer, the phase called "will," another, like Schelling, may prefer "feeling," a third like Hegel, may prefer "reason." Whatever the favored psychological prototype, nature and her laws are redefined as simply projections thereof, non-Egos, "posited" by the Ego of variable name.

The case of Hegel is important for its influence. The Reason he celebrated is profoundly discontinuous with the Reason celebrated by Aristotle or the eighteenth century. It consists in throwing the venerable laws of thought overboard, in the rejection of the law of contradiction, and in the identification of opposites.

The influence of this meaning of Reason on the philosophies which were official and vogue from the middle of the nineteenth century is too recent to need dwelling on. The contemporary of the post-Napoleonic restoration of monarchical legitimism and ecclesiasticism on the continent of Europe, this Rationalism's technique and formulae came ready to hand as a facile rationalization for the pretensions of these establishments to primacy in a world too weakened by wars to do them much harm, but nevertheless without any kindness for them. The Reason of Hegelianism justified in the romantic mood that rule, so comforting to the privileged classes, which the eighteenth century had justified in the mechanistic, the rule *Whatever is, is right*. As used by the eighteenth century, however, the rule was set up to support vested interests by exploiting the revolutional definition of Nature provided in the terms of the Newtonian mechanics. As used by the nineteenth century the rule vindicates an oligarchical system of privilege by employing a revolutionary definition of spirit, in which mass is "sublated" into class, and all self-government into autocracy, especially when its powers are concentrated in a legitimate absolute monarch such as was the King of Prussia. Reason *à la Hegel* was, no more than Reason according to Newton, an insight into the actual courses of experience. Each was an endeavor to portray a

special interest within those courses as coincident with their totality. Theories of the state, especially of the type that prevailed in Germany, and theories of the church, conspicuously of the type that prevailed in England, both took Hegelianism as the means of their rationalizations. They sought, in a word, to bolster up with "reasons" a class or an establishment which was too weak by its own strength to compete with rivals for survival. For several generations Reason was held to consist in the nullification of the law of contradiction, in a dynamic which Hegel called "negativity."

9. The Hegelian point of view did not lapse because of the superior validity of the arguments of its antagonists. It has been displaced and has fallen into desuetude. It has been displaced by the success of institutions and interests which it did not serve. Of these, Democracy was one; mathematics and the material sciences were another; the theory of evolution was a third.

10. Though the French Revolution failed, the passions which it uttered did not subside. They continued to surge against every disaster and every disillusion. Broadly, they were the aspirations toward democracy which made so much of the history of the nineteenth century. They continued to propound the eighteenth century ideology with which they developed, the ideology of the natural man with his natural rights, equal, free, and pursuing happiness each in his own way. Democratic Reason used the same justifications of the democratic purpose. The views and formulae in which it consists are still revered, if not operated, in most of the countries of the western world—in France, in England, and conspicuously in the United States. They were the chief ratiocinative weapons of the British liberals of the early nineteenth century. They remain the political liturgies of such spokesmen of the vested interests of the United States as Mr. Herbert Hoover, who sums them up as "American individualism." Hegelian Reason never took an important place in this country. It had a vogue among philosophers and clerics, and helped out a little the "Genteel Tradition." But as there was no established church, evangelical dissent did well enough with the Aristotelian or Newtonian meaning of Reason, and democracy and the Newtonian implied one another.

11. As for the sciences—the more self-conscious physics, chemistry, physiology, and their subdivisions became, the more fully aware they grew of their methods, instruments, and presumptions, the less they stressed the mathematical techniques of the generations of Descartes, Newton, and Laplace; and the more they tended to favor a point of view to which the events challenging analysis and correlation grew more important than the process of ratiocination. As against the "deductive" systems of Aristotle and the mathematical disci-

plines, a theory of induction was formulated. The canons of this procedure are associated primarily with the name of John Stuart Mill, but it can be argued that the American Charles Pierce made as significant a contribution to the theory.

Since the definition of induction there have been several endeavors to demonstrate that induction is "really" deduction. I suspect that the endeavorers have been misled by the nature of their words, and have attributed similarities in language to the things that language is language about. What is elemental in the difference between induction and deduction is the reasoner's attitude. If he regards his tools, his symbols, then they have an identity, a universality. Individuality, difference, novelty, are for him obstacles to be overcome, othernesses to be nullified. He presumes that they are either illusory or indifferent. The exception does not test the rule, but demonstrates it; that is, it is no exception. Whereas, to the genuinely inductive thinker, the exception is an exception. He regards the thing, not the tool. Every new instance is a stimulus to doubt, a challenge to inquiry, a cause of genuine uncertainty, not a step in the circle which argues a foregone conclusion. To the inductive thinker individuality, novelty, and difference are indefeasible and can not be set aside. It is not so much that he discovers an identity as that he makes an identification. And this identification is a leap over a chasm involving risk. His general principles and universal rules are the consequences of his taking such chances; they are not primary but eventual. They ensue upon the discrete data as the conclusion to them: they neither generate them nor control them, but merely express them.

To think in this manner is, however, to do violence to the native bent toward unity, identity, and universality apparent in most of the processes of the organism. It is too rigorous, too disciplined to the diversifying actualities of experience, and so too disagreeable and arduous to head and heart to suit the rationalist who prefers the smooth inevitable transitions of the deductive technique and the comforts of the closed circle of that kind of Reason. . . .

12. Neither Democracy nor the sciences of matter called for a mitigation of the staticism of Aristotelian and Newtonian and Hegelian ways. These three dominant meanings of Reason postulated a world intrinsically structural, constituted by terms and relations eternal and immutable, whose apparent changes were phenomenal illusions, to be dissipated into the fixities they disguised and belied. That is, the world these types of Reason defined looked toward the relative constancy of our language habits rather than toward the variabilities of the wider and more rapid flux of experience which these habits spanned by symbolizing. The orders of Reason are in-

deed projections and hypostases of the orders of speech. That they should in any other wise exist, universal and eternal, and that Reason should know them and correspond to them in its inner structure must needs be an irrational assumption, it can not be a demonstration. Why should the competency of thinking depend upon the resemblance, nay, upon the identity, of the aggregated orders of nature with a particular sequence of thought called "logical"? Why should the belief that it does, be anything more than a homeopathic superstition? It is a belief that prevails, however, in the best logistical circles.

The dogma may be entirely rational, but reasonable it can hardly be. For if Reason were what this dogma declares it to be, it could not be known; Reason-as-known repudiates the dogma. Taken empirically, the logical process which converts the differents of thought's environment into the sames of thought, consist of a great and extended manipulation of symbols, propositions, equations; of inferences, transformations, and restatements. It suggests the operations of a machine which makes woods over into silk, or cows and pigs and horses and corn-meal into sausages. Or, if you prefer, it is analogous to the digestive processes of a body which transmute the varieties that enter it into flesh of its flesh or bone of its bone. Their present sameness consists, at the same time, of a new difference, for if it makes them like each other, it also makes them unlike themselves, and is a new individuality displacing those others. Empirically, we do not encounter sames except in the form of symbols, of words and signs applied to differing objects. Identity seems ever to be an inference, and difference ever an experience, and logical thinking seems for the most part to consist in the identification of the different. That such an identification must reveal rather than conceal what it identifies is a gratuitous assumption dear to the heart, an assumption whose advantages to life and thought are so obvious that the spontaneous and swift diffusion of its use, once it had occurred, would be equally obvious. Recognizing this is recognizing the logical process as a vital function, as an organ or tool of a living being in its struggle to live.

This meaning of Reason is the meaning that accrues to it from the theory of evolution. Darwinism turned the attention of students of the human mind from static correspondences to adjustive processes of change, to activities, relations, functions. As the Darwinian insight interprets experience, genera do not persist eternally. There is an origin of species—and if an origin, why not end?—of species of whatever sort; macroscopic and astronomical or microscopic and bacterial; "laws of nature" and fashions in hats. Eternity is merely change at a slower tempo than time. Universality is simply a more diffused individuality than concreteness. Necessity is simply con-

tingency massed. Change and chance are intrinsic to each thing or relation in its unique mode; so that it happens, it survives, it lapses. The individuality of its happening is not foregone conclusion, but a spontaneous variation, a novelty, a surd. Its persistence is a consequence of the interplay of this individuality with the effective environment in which it happens; it is an adjustment, the term reached through a struggle for survival. Its lapsing is the process of defeat in that struggle. Mankind, one species among many, came to its present state from an origin in some spontaneous differentiation within an already-existing type, through a long process of still-unended struggle with its ancestors as well as its other neighbors.

Now the human animal has many differences from other animals, but the variation on which the cultural tradition has dwelt most is the "faculty" of reason. We have already observed that this "faculty," studied as it works in the courses of the daily life, tends to reduce to the function of symbolization, of speech and language; when discussed transcendentally, it is called Reason. Its observable character consists in symbols—gestures, pictures, graphs, spoken and written language, etc., etc., and the techniques of making and applying them. The application effects an extended interaction with the environment, the remote and absent parts of it as well as the near and present, and leads eventually to its control—that is, to rendering it directly or indirectly congruous with the passions and purposes of the human heart.

This meaning of Reason constitutes it a particular function in mankind's struggle to live in a world which was not made for it. Reason gets defined as an irrational organ growing from irrational roots and sustained not by the identities it reveals but by the differentiations it accomplishes. Its status is changed from a somehow supernatural faculty to a bio-psychic function; its proportions become commensurate with the residual human scale. The pretensions to cosmic insight are set in their specific place as specific activities responsive to a specific situation in a biography. The sciences of man, such as anthropology, philology, and psychology, have gathered extended confirmations of this meaning of Reason; contributions have come also from mathematics and physics. So that in the current thought about Reason psychologists like James, physicists like Mach, mathematicians like Poincaré, logicians like Schiller and Sheffer, anthropologists like Malinowski, poet-philosophers like Santayana, and philosophers like Dewey provide a consensus on it.[1]

[1] To be concluded in next issue, No. 22.

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BOOK REVIEWS

A History of Indian Philosophy. SURENDRANATH DASGUPTA. Volume One, 1922, Second Impression, 1932; Volume Two, 1932. Cambridge: University Press. Pp. xvi + 528 and xi + 620.

With the publication of volume two of this important *History of Indian Philosophy,* the second impression of the first appears. It is now ten years since Dr. Surendranath Dasgupta, Principal of the Sanskrit College in Calcutta, issued the first volume of this work. At once it took its place in the front rank of treatises on the history of Indian philosophy, a position which it still holds.

Volume One covers a good deal of the ground usually brought into view in an account of Indian philosophy, including, as it does, expositions of the philosophical ideas of the *Vedas,* the *Brāhmaṇas,* and the early *Upaniṣads;* the philosophies of the Buddhists and Jains; the Sāṃkhya and the "Pātañjali Sāṃkhya"; the Nyāya, the Vaiśeṣika, and the Mīmāṃsā; and, in part, the Vedānta. The author inserts, just before taking up the history of the development of philosophical thought in Buddhism, an interesting and illuminating chapter entitled "General Observations on the Systems of Indian Philosophy." Each chapter exhibits clearly the growth of Indian thought.

The special points of view in volume one are already familiar to students of Indian philosophy. The *Upaniṣads* present, not a system, but a collection of the speculations of numerous thinkers scattered over several centuries. The creative period in Indian philosophy lies behind the Christian Era (B.C. 700–200), with the early *Upaniṣads* in the first two centuries of that age. To the second century B.C. belong the *Vaiśeṣika-* and the *Yoga-sūtras.* The *Brahma-sūtras* and the *Pūrva Mīmāṃsā* were written about 200 B.C. The Buddhist and the Jain systems arose in the fifth century B.C. Each of the systems had a long history, centuries of speculation, debate, and exposition, before it was formulated. A statement from the former review of the first volume, in this JOURNAL, Vol. XXI (1924), pp. 77–80, will suffice to call attention to other features of the work. "Among points of special interest in this volume, the reviewer may observe that Dasgupta seems rather cool toward the view that Buddhism was largely indebted to the Sāṃkhya; the discussion, for the first time, of the Sāṃkhya system of Caraka; the position that Kapila's Sāṃkhya was theistic; the theory that the Vaiśeṣika represents an old Mīmāṃsā school; the relation of the Pūrva Mīmāṃsā to Nyāya-Vaiśeṣika and Sāṃkhya-Yoga; the contrast between Buddhism and *Upaniṣads,* between Brāhmanism, Buddhism, and Jainism, between Nyāya-Vaiśeṣika and Sāṃkhya-Yoga."

The treatment of the Vedānta, as set forth in the first volume, is incomplete, being limited to a partial survey of the history of the Śaṅkara school, with the use of the method of Padmapāda as interpreted by Prakāśātman. In the second volume of his *History*, the author devotes a further chapter (of 227 pages) to writers belonging to the school of Śaṅkara. The chapter contains many valuable illustrations of the speculation and didactic employed by these men, written with balance and with much breadth of knowledge. All the great names, and some obscure ones, belonging to the school, are introduced. These include Maṇḍana, Suresvara, Padmapāda, and Vācaspati Miśra, belonging to the age of Śaṅkara, followed by Sarvajñātma Muni, Ānandabodha Yati, Śrīharṣa, and Citsukha, notable names in the succeeding centuries. Eight pages are given to "The Dialectic of Nāgārjuna and the Vedānta Dialectic," and eighteen to "Dialectical Criticisms of Śāntarakṣita and Kamalaśīla as Forerunners of Vedānta Dialectic." This is followed by eleven pages on the "Dialectic of Śaṅkara and Ānandajñāna." The remainder of the chapter is taken up with expositions of points of view of Vimuktātman, Rāmādvaya, Vidyāraṇya Nṛsiṃhāśrama Muni, Apaya Dīkṣita, Prakāśānanda, and Madhusūdana Sarasvatī. In the early pages of the chapter is found an illuminating discussion of "Thought and its Object in Buddhism and in Vedānta."

While the philosophical elements in the various Purāṇas are to be reviewed in a later volume of his *History*, still, the author devotes the second chapter of his second volume to the *Yoga-vāsiṣṭha-Rāmāyaṇa*. For this he gives the following reasons: "The philosophical view with which it is concerned, and which it is never tired of reiterating, is so much like the view of Śaṅkara and of Vijñānavāda Buddhism, that its claim to treatment immediately after Śaṅkara seems to me to be particularly strong. Moreover, the various interpretations of the *Vedānta-sūtra* which will follow are so much opposed to Śaṅkara's view as to make it hard to find a suitable place for a treatment like that of the *Yoga-vāsiṣṭha* unless it is taken up immediately after the chapter dealing with Śaṅkara." The poem, consisting of 23,734 verses, belongs to the seventh or eighth century (A. D.). Dr. Dasgupta's is the first adequate exposition in English of this important work. Some of its positions are set forth in the following quotations and notes:

"There is in reality no perceiver, perceived, or perceptions, no vacuity (*śūnya*), no matter, no spirit or consciousness, but pure cessation or pure negation, and this is what we mean by Brahman." "The world as such never existed in the past, nor exists now, nor will exist hereafter; so it has no production or destruction in any real sense. But yet there is the appearance, and its genesis has

somehow to be accounted for. The ultimate entity is . . . of the nature of pure cessation." The order of evolution of appearance is due to pure accident. And the creations are all ideal and as such have no reality apart from their being as mere appearance. "All that appears as existent does so only as a result of the conceptual activity of thought."

As for the doctrine of emancipation, "To a person who has a perfect realization of the nature of the world-appearance, as being mere conceptual creation from the Brahman and having no existence at all, there is no sorrow in this world-appearance nor any such quality which is different from Brahman." Emancipation can be attained in the life of a person or after his death. In the former case "he is absolutely unattached to anything, but is not cut off from society and can seemingly take part in everything without losing his mental balance in any way."

"One of the special features of the *Yoga-vāsiṣṭha* is the special emphasis that it lays upon free-will and its immense possibilities, and its power of overruling the limitations and bondage of past *karmas.*" "The *Yoga-vāsiṣṭha* not only holds that *pauruṣa* (mental and physical exertions made in properly advised ways) can conquer and annul *daiva,* but it even goes to the extreme of denying *daiva* and calling it a mere fiction, that, properly speaking, does not exist at all." "*Prāṇa* (the movement of the intellect as *ahaṃkāra*) is essentially of the nature of vibration (*spanda*), and mind is but a form of *prāṇa* energy, and so by the control of the mind the five *vāyus* are controlled." "The unreal and illusory manifestations of the reality, are produced by the operation of this inner activity of the characterless spirit, which is in itself nothing but subject-objectless pure consciousness. But this inner and immanent movement does not seem to have any dialectic of its own, and no definite formula of the method of its operation for its productions can be given; the imaginary shapes of ideas and objects, which have nothing but a mere perceptual existence, are not due to a definite order, but to accident or change (*kākatālīya*). Such a conception is indeed very barren, and it is here that the system of the *Yoga-vāsiṣṭha* is particularly defective. Another important defect of the system is that it does not either criticize knowledge or admit its validity, and the characterless entity which forms its absolute is never revealed in experience."

The subject, "Speculations of the Medical Schools," which forms the third chapter of volume two, is included in the *History* for the following reasons: "In ancient India, Biology had not grown into a separate science; whatever biological ideas were current in India were mixed up with medical, osteological and physiological specula-

tions, the only branches of study in ancient India which may be regarded as constituting an experimental science."

So far as texts are concerned, "We thus find that Ayur-veda was regarded by some as a Veda superior to the other Vedas and represented by their followers as a fifth Veda, as an *upa-veda* of the *Atharva-veda,* as an independent *upa-veda,* as an *upāṅga* of the *Athara-veda* and lastly as a *vedāṅga.*" Of the Āyar-veda we now possess the treatises of Caraka and Suśruta.

Aside from the discussions on physiological topics, including sections on "The Foetus and the Subtle body," and "Foetal Development," the chapter is interesting as showing how use is made of logical definition and method for diagnosis and to determine the nature of disease and of its cure.

"The ideal of the good life in Caraka is not the same as that of the different systems of philosophy which are technically called the Science of Liberation (*mokṣa-śāstra*). The fundamental idea of a good life is that a life should be so regulated that the body and mind may be free from diseases, that it should not run into unnecessary risks of danger through carelessness, that it should be virtuous, pure and moral; that it should be a prudent and wise life which abides by the laws of polite society and of good and loyal citizens, manifesting keen alertness in thought and execution and tending constantly to its own good—good for all interests of life, body, mind and spirit."

"Medicines may, however, in the case of those who are not cursed by the commission of sins of great enormity, prolong the normal length of life. It is here that Caraka and his followers differ from all other theories of *karma* that flourished on the soil of India."

In the fourth and last chapter of volume two, Dr. Dasgupta discusses the philosophy of the *Bhagavad Gītā.* His exposition is based upon the contention that the *Gītā* has a system all its own, not one growing out of an attempt to synthesize Sāṃkhya and Vedānta philosophies. This is because the *Gītā* is a book of high antiquity, antedating Buddhism. "The *Gītā* may have been a work of the Bhāgavata school, written long before the composition of the *Mahā-bhārata,* and may have been written on the basis of the Bhārata legend, on which the *Mahā-bhārata* was based. It is not improbable that the *Gītā,* which summarized the teaching of the Bhāgavata School, was incorporated into the *Mahā-bhārata* during one of its revisions, by reason of the sacredness that it had attained at that time."

Some of the author's expositions are of special interest. The philosophy of the *Gītā* "is diametrically opposite to that of Śaṅkara." "The *yoga* of the *Gītā* is quite different from the *yoga* of Patañjali, and it does not seem at all probable that the *Gītā* was aware of

Patañjali's *yoga* or the technical terms used by him." The word *sāṃkhya* is used in the *Gītā* "in the sense of path of knowledge or of philosophical wisdom."

One or two sentences may be quoted from the author's excellent exposition of *dharma*. "The word *dharma* in the *Gītā* does not mean what Jaimini understood by the term, viz., a desirable end or good enjoined by the sacrifices. . . . The word seems to be used in the *Gītā* primarily in the sense of an unalterable customary order of class-duties or caste-duties and the general approved course of conduct for the people, and also in the sense of prescribed schemes of conduct. The meaning of *dharma* as "old customary order" is probably the oldest meaning of the word. . . . The central meaning of the word *dharma* in the *Gītā* is therefore the oldest Vedic meaning of the word, which is a much earlier meaning than the latter day technical meaning of the word as found in the Mīmāṃsā. *Dharma* does not in the *Gītā* mean sacrifices (*yajña*) or external advantages, as it does in the Mīmāṃsā, but the order of conventional practices involving specific caste-divisions and caste-duties."

There are also in this chapter carefully developed studies of such terms as *prakṛti, puruṣa, avyakta,* and *karma.*

The section entitled "The Ethics of the Gītā and the Buddhist Ethics" is full of interest. "The *Gītā* bases its ethics mainly on the necessity of getting rid of attachment and desires from which proceeds greed and frustration of which produces anger." "A man should always follow his own caste-duties, which are his own proper duties, or *sva-dharma.*" The reply to the charge that war implies injury to living beings is "that the proper way of performing actions is to dissociate one's mind from attachment." "To give up work can be significant only if it means the giving up of all desires for the fruits of such actions." "The *samādhi* of the *Gītā* is not a mere concentration of the mind on some object, but communion with God, and the wisdom, or *prajñā,* of the *Gītā* is no realization of any philosophic truth, but a fixed and unperturbed state of mind, where the will and intellect remain unshaken in one's course of duty, clear of all consequences and free from all attachments, and in a state of equanimity which cannot be shaken or disturbed by pleasures or sorrows." "Morality from this point of view (of the unattached mind) becomes wholly subjective, and the special feature of the *Gītā* is that it tends to make all actions non-moral by cutting away the bonds that connect an action with its performer."

"The *Gītā* is probably the earliest document where a definite statement is made regarding the imperishable nature of existent things and the impossibility of that which is non-existent coming into being. . . ." "The main purpose of the *Gītā* is not to find out

how one can tear asunder the bonds of *karma* and stop rebirth, but to prescribe a true rule of the performance of one's duties."

Three passages under the heading "God and Man" must suffice to complete this rapid survey of the chapter. "The earliest and most recondite treatment regarding the nature and existence of God and His relation to man is found in the *Gītā*." "This doctrine of the incarnation of God, though not dealt with in any of the purely speculative systems, yet forms the corner-stone of most systems of religious philosophy and religion, and the *Gītā* is probably the earliest work available to us in which this doctrine is found. The effect of its introduction and of the dialogue form of the *Gītā*, in which the man-god Kṛṣṇa instructs Arjuna in the philosophy of life and conduct, is that the instruction regarding the personality of God becomes concrete and living." "For the God of the *Gītā* is not a God of abstract philosophy or theology, but a God who could be a man and be capable of all personal relations."

These volumes impress the reader with their solidity and scope. The work is thoroughgoing, clearly set forth, revealing the erudite and mature scholar. The notes, mostly in Sanskrit, constitute a mass of documentation, showing that the chief sources for the preparation of such a *History* as this have been fully surveyed. While the author is conversant with the history of Western philosophy, still, he does not attempt to explain Indian and Western systems in terms of each other. All the while he is bent on writing a thorough and impartial history of *Indian* philosophy. The whole weight of his learning and labor is imposed upon the Indian point of view. In this respect his *History* stands practically alone, and it is for this reason that it is of such great importance.

Thirty-four pages of volume one and eighty-six pages of volume two are occupied with an exhaustive index of both Sanskrit and English references. The book-work is excellent and both volumes are remarkably free from errors.

The author announces that volume three, which is well along towards completion, will contain a fairly elaborate account of the principal dualistic and pluralistic Indian systems, "such as the philosophy of the Pañca-rātra, Bhāskara, Yāmuna, Rāmānuja and his followers, Madhava and his followers, the *Bhāgavata-purāṇa* and the Gaudīya school of Vaiṣṇavism." Volumes four and five will deal "with the philosophy of Vallabha and some other lesser known schools of Vaiṣṇavism, the philosophy of the Purāṇas, Tantras, the different schools of Śaivas, Śāktas, Indian Ascetics, the philosophy of right and law and the religious systems that have found their expression in some of the leading vernaculars of India."

This great work is planned on very broad and inclusive lines and

bids fair to become the authoritative work in English on the history of Indian philosophy. Volumes one and two speak in the highest terms for the promise of those which are to follow.

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The Physical Significance of the Quantum Theory. F. A. LINDEMANN. Oxford: At the Clarendon Press. 1932. 148 pp.

This book by a distinguished physicist is a notable contribution to the epistemological problems raised by the quantum theory.

During the era of classical physics physical phenomena were described primarily as the motions of particles or of waves. Thus in the nineteenth century the phenomena of interference and diffraction furnished the basis for the interpretation of light as a wave motion. After the work of Maxwell light was definitely conceived to consist of electromagnetic waves. But the nineteenth century also witnessed the discovery of positively and negatively charged particles, of which the atoms of the chemist appeared to be constituted. The emission and absorption of electromagnetic waves was attributed to the motion of the electrified particles in the atom. Thus classical physics furnished the material for a theory of the structure of the atom and of its interaction with electromagnetic radiation. It is now well known that the classical concepts proved to be inadequate for a description of elementary processes in the atom and in radiation. The inadequacy of the classical theories has led to the quantum theory which in recent years has attained a relative stability. The equations which enable one to describe and predict quantum phenomena are generally accepted. There remains, however, the problem of the interpretation of the quantum theoretical concepts. This problem of interpretation is especially exemplified by the complementary use of the concepts of particle and of wave. Electrons, which had been demonstrated to be particles, have been shown to exhibit wave characters. Light, which was definitely supposed to be a wave motion, has exhibited properties which belong to particles. Thereby the sharp distinction which the classical physicist made between particles and waves disappears and thus the clarity of the classical picture of physical reality is lost.

One authoritative mode of expounding the dualism, that of Dirac, is the following. The fundamental idea of the quantum theory is that an atomic entity, such as an electron, is to be described as existing in a certain state. The functions which describe the state satisfy a wave equation, called Schrödinger's equation. Now a state may be formed by the superposition of a set of component states. As is well known, the interference phenomena of light were explained in

terms of a superposition of waves. Accordingly the superposition of states which are described by wave functions is the quantum theoretical basis for the description of a reality which manifests wave characteristics. The wave functions are interpreted as probability functions. That is, the square of the absolute value of a wave function for certain values of the coördinates determines the probability that the electron is to be found at the position defined by the space coördinates. We can therefore represent the electron as a particle whose probability of position in space is determined by a wave function. The interference phenomena of electrons, and also of photons, are described by an interference of probabilities which represent the component states. The destruction of light by interference, for example, is described as a superposition of states so that the probability of position for the photon in the resultant state is zero. In this way both the corpuscular and wave properties of electrons and photons are expressed by the quantum theory.

Professor Lindemann, while accepting the rigorous mathematical theory, seeks, however, a more physical basis for the quantum theory. The thesis of his book is that the difficulties in the interpretation of quantum phenomena arise from the persistence of the habit, acquired in the classical study of large-scale phenomena, of separating the space-time description of a process from its dynamical description. In classical physics it was possible to assign space-time coördinates to a body independently of dynamical coördinates, because the process of measurement did not appreciably disturb the state of a system. But the measurement of an atomic system disturbs it. The space-time description of an atomic entity must be supplemented by a statement of the changes in the dynamical coördinates which are produced by the measurement. A principle of indeterminacy shows how the dynamical variables are changed by space-time measurements which have specified limits of accuracy. By a direct employment of his principle of indeterminacy the author obtains by simple and original methods the most important results of the quantum theory.

The author's solution of the dualism between particles and waves is as follows. He adopts the view that reality is built up of particles. There is no reality attached to the wave aspect; it is a makeshift to get over the failure of space-time description which occurs when the error introduced by observation is comparable with the quantity to be measured. The wave equations are merely an expression of the fact that the neglected dynamical coördinates can not be omitted from a spatio-temporal description of atoms.

Probably the most interesting philosophical presupposition in the book is the assumption that all coördinates must be observable in

principle. Any spatio-temporal statement must imply that the particle is in the same circumstances as it would have been had the appropriate measurement been made. Now the determination of position requires an interaction which produces a change in momentum. The position of a particle at rest is therefore changed and the measurement is not reproducible. Thus the concept of exact position loses its meaning; the precise space-time concepts of classical physics are limits. The epistemological presuppositions of the quantum theory are aptly described by Professor Lovejoy's phrase, the experimental theory of meaning. The reviewer has also employed the expression, subjectivistic criterion of reality. The rigorous application of this criterion leads writers on the quantum theory to doubt the existence of the electron between observations.

Professor Lindemann's book is an original and brilliant contribution. Except for one chapter the book is non-mathematical and should be as accessible to philosophers as Bridgman's well-known book. Although the book is not a substitute for a rigorous exposition, it is an admirable introduction to the spirit of the quantum theory. The quality of the style is exemplified by the concluding paragraph:

"Be that as it may, the recognition of the inadequacy of spatio-temporal coördinates has introduced a new and resilient factor into the hard and unyielding mechanism of classical physics. The harsh sequence of cause and effect has lost its power, the implacable rule of determination its rigour. The narrow crust in which our predecessors encased our mental processes has been breached and we are entitled henceforward in the order of our physical concepts to question the grim pre-eminence accorded by age-long consent to time."

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Philosophical Aspects of Modern Science. C. E. M. JOAD. New York: Macmillan Company. 1932. 344 pp.

The fundamental thesis of Mr. Joad's philosophy is that knowing is awareness of an object which is unmodified by the process. Thus knowing is not creative, but exploratory, revealing to the knower the nature of the diverse orders in the universe. In perception we become aware of the realm of sense-data. The apprehension of sense-data leads the mind to think of subsistent objects. The realm of subsistence includes physical objects, such as tables and chairs, and scientific objects, such as electrons and electromagnetic waves. The realm of value extends beyond that of subsistence but, somewhat in the manner which Plato has described, the mind is enabled to attain

fleeting glimpses of beauty through the contemplation of works of art which belong to the subsistent realm. The mystic, however, is directly aware of values.

In addition to the worlds of subsistence and value, which are static, eternal, and independent of mental activity, Mr. Joad postulates the presence in the universe of a dynamic force or principle of change. Individual minds are expressions of the universal force or principle of life. Life is thus a dynamic impulsion, whose nature is to change and evolve, and whose activity is to know. The two orders of reality, life and value, are radically opposed.

Now Mr. Joad finds that the metaphysical speculations which are based upon modern physics are idealistic theories which assimilate the universe to mind. In contrast to his own fusion of Platonism and Bergsonism, Mr. Joad holds that Eddington and Jeans have distinguished between reality and appearance, have insisted on the mental and even personal nature of the world of reality, and have adopted a malicious attitude toward the world of appearance which leads to a denial of objective reality to the familiar world and even to the world of science.

The present book is a criticism of the metaphysical theories which have been based upon contemporary physics. In the first four chapters the author criticizes the idealism of Eddington and Jeans and Russell's theory of neutral stuff. In the following three chapters he outlines his constructive theory of the relations between the realms of sense-data, physical objects and scientific objects. In two succeeding chapters he turns to metaphysics and expounds and criticizes the monistic theory which is set forth by Eddington. The two final chapters present Mr. Joad's own pluralistic metaphysics.

Mr. Joad's criticism of Jeans and Eddington is excellent. I wholly agree with him when he says, "It may, I think, fairly be urged that the temper of mind from which these metaphysical speculations spring, and in which they are conducted, is fundamentally unscientific." Mr. Joad's exposition of his own theory is clear and readable. The discussion of the theory of value contains paragraphs of delightful literary quality. I would offer, however, two criticisms of this admirable book. One is that the philosophy of science which it contains is very scanty. A distinguished German philosopher once remarked to me that Reichenbach's *Philosophie der Raum-Zeit Lehre* is physics and not sufficiently philosophical. Of Mr. Joad's book one may say that it is essentially theory of knowledge and metaphysics with only incidental use of scientific material. With admirable judgment, Mr. Joad refrains from criticizing the scientist on his own ground. Nevertheless, there are many topics which ought to be included in a book with the given title, but which are entirely ignored.

As a second criticism I remark that the views of Eddington and Jeans are given much more notice than is warranted. The speculative tendencies of these physicists are not to be taken as representative of the best philosophical discussion of contemporary physics. Mr. Joad does not even mention the very important positivistic movement in Central Europe, the leaders of which are Schlick, Carnap, Philipp Frank, etc. The members of this school are competent both in physics and philosophy and their emphatic rejection of metaphysics stands in sharp contrast to the views of Eddington and Jeans, who concede themselves to be amateurs in philosophy.

This leads to a final comment upon Mr. Joad's book. Within the frame of ideas to which he restricts himself his discussion is admirable. I am impressed, however, with the interest exhibited by the younger generation of philosophers and theoretical physicists in the logical positivism of the Viennese school and the related pragmatic views of C. I. Lewis. As definitely expressed by Carnap, the logical positivist holds that the traditional issue between idealism and realism is an illusory one. But the realistic revolt against idealism and the disputes between neo-realists and critical realists presupposed that the issues were meaningful. It would appear that realists and idealists should discontinue their civil warfare and unite against the logical positivist, in order to preserve, if possible, the problems which have been inherited from several centuries of philosophical speculation.

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Philosophy and Modern Science. HAROLD T. DAVIS. Bloomington, Indiana: The Principia Press. 1931. Pp. xiv + 335.

This is a substantial piece of work devoted not to modern science in general, but rather to modern physical science. Its aim is to "set forth as simply as possible the basic postulates of physics and to trace their implications." The major part of the book is devoted to a generally successful non-technical exposition of the development of modern physical theories. The account of their philosophical consequences is distinctly inferior.

A sketch of the philosophical background of modern physics serves as an introduction to a detailed exposition centering about the following topics: (1) the problem of the ether and the Special Theory of Relativity, (2) gravitation and the General Theory of Relativity, (3) the development of atomism and quantum physics, (4) recent cosmology and the nature of cosmic radiation. All of these, with the partial exception of the third, are treated very ably indeed. Thus.

the intimate relationship between Relativity physics and classical physics is actually revealed and not merely asserted. Primary sources are reproduced extensively in the historical portions of the work. Experimental detail is abundant and well-chosen. The result is a surprisingly well-rounded account, achieved without mathematical complexities.

Apart from one or two minor factual slips, the chief defect is the discussion of recent quantum theory. Here the reader is brought as far as wave and matrix mechanics and left to wonder how it is that matter and radiation can possess both wave and particle properties. The contradiction, however, is merely apparent. A judicious use of Bohr's concept of complementarity would have made this reasonably clear without formulae and thus contributed to a less misleading picture of contemporary quantum theory. Darwin's recent *The New Conceptions of Matter* demonstrates that such an objective is attainable.

As popularization of the better sort, *Philosophy and Modern Science* possesses genuine merit. As an essay in the philosophy of physics, it leaves much to be desired. Certain key problems are posed, such as continuity and atomism, gravitation and geometry, the interaction of matter and radiation, the nature of probability (to which a special chapter is devoted); but the critical apparatus brought to bear upon them is weak. To be sure, rigorous analysis may have been sacrificed in the effort to retain simplicity. At all events, the fact remains that the fragmentary philosophical passages contribute little to the clarification of the fundamental concepts of modern physics.

Professor Davis means by the philosophy or metaphysics of science not traditional ontology, but simply the attempt to explore the meaning of "the concepts upon which modern science seeks to found its theories" (p. 1). However, the absence of a rigorous critical apparatus with which to conduct this exploration exhibits itself at the very outset in the author's essentially metaphysical conception of physics. As the use to which he puts the terms "subjective," "objective," and "rational" indicates, he is guilty of the widespread error of treating the entities of physics in the fashion of realistic metaphysics. Such a treatment misconstrues the relationship between the "world" of physics and the ordinary commonsense world and, in the words of Professor McGilvary (this JOURNAL, vol. XXIX, 1932, p. 371), makes "metaphysical entities out of mathematical equations." This error can be avoided best by employing the operational analysis of physical concepts as developed by (Peirce, Dewey,) Bridgman, Carnap, and Lenzen. If in this way an end be put to the hypostatization of mathematical relationships.

the connection between mathematics and physics and between physics and the common-sense world, so obscure in Professor Davis' book, becomes immeasurably clearer.

The author does discuss Bridgman's operational point of view. He recognizes that it entails the elimination of many questions as meaningless and concludes: "Perhaps this is the solution of the problem of philosophy, but while man sees or thinks he sees the possible synthesis of natural law in such abstract concepts as entropy and action he will not wish to dismiss thus lightly from his speculations any abstractions which might lead to deeper insight (p. 39)." If this is simply a warning against too facile a disposal of questions as meaningless, the point is well taken. This is a danger to which all "corrective" theories of meaning are subject. But where, as in Professor Davis' own struggles with the question of the existence of the ether, it is apparent that no intelligible alternative is being employed, the failure to see the basic importance of the operational approach is difficult to excuse.

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NOTES AND NEWS

In No. 15 of the current year of this JOURNAL, we printed the announcement of the Hartmann Prizes, which stated that the essays must be sent in before June 1, 1933, to the Director of Studies, British Institute of Philosophy, London. We have received word that the time has now been extended to January 1, 1934.